

Appl. No. 10/617,620

Docket No. RTN-141PUS

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

1 1. (Original) A radiator element comprising:
2 a pair of fin-shaped substrates spaced apart from one another, each having a transition
3 section and a feed surface;
4 a balanced symmetrical feed having a pair of radio frequency (RF) feed lines disposed
5 adjacent to and electromagnetically coupled to a corresponding one of the feed surfaces; and
6 wherein the pair of radio frequency feed lines forms a signal null point adjacent the
7 transition sections.

1 2. (Original) The radiator element of Claim 1 wherein:
2 the balanced symmetrical feed further comprises a housing having a plurality of sidewalls
3 forming a cavity; and
4 the pair of feed lines are each disposed on a corresponding one of the sidewalls and
5 comprise a microstrip transmission line.

1 3. (Original) The radiator element of Claim 1 wherein the pair of fin-shaped substrates are
2 disposed to form a tapered slot.

1 4. (Original) The radiator element of Claim 1 wherein the balanced symmetrical feed is a raised
2 balanced symmetrical feed.

1 5. (Original) The radiator element of Claim 1 wherein a first one of the pair of radio frequency
2 feed lines is adapted for receiving a radio frequency signal and a second of one the pair of radio
3 frequency feed lines is adapted for receiving a radio frequency signal phase shifted by
4 approximately 180 degrees.

1 6. (Original) The radiator element of Claim 1 wherein the pair of substrates are provided from
2 an electrically conductive material.

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- 1 7. (Original) The radiator element of Claim 6 wherein the pair of substrates comprise copper
- 2 plated metal.

- 1 8. (Original) The radiator element of Claim 1 wherein the pair of substrates comprise a
- 2 metalized substrate.

- 1 9. (Original) The radiator element of Claim 1 wherein each of the substrates has a height of less
- 2 than approximately $0.25\lambda_L$, where λ_L refers to the wavelength of the low end of a range of
- 3 operating wavelengths.

- 1 10. (Original) The radiator element of Claim 1 further comprising:
 - 2 a second pair of substrates spaced apart from one another each having a transition section
 - 3 forming a second tapered slot and having a second feed surface wherein the second pair of
 - 4 substrates form a plane which is substantially orthogonal to a plane formed by the first pair of
 - 5 substrates;
 - 6 wherein the balanced symmetrical feed includes a second pair of radio frequency feed
 - 7 lines each disposed adjacent to and electromagnetically coupled to the feed surface of one of the
 - 8 second pair of transitions; and
 - 9 wherein the second pair of radio frequency feed lines are electromagnetically coupled to
 - 10 the second feed surfaces adjacent the signal null point.

- 1 11. (Original) The radiator element of Claim 1 wherein each of the feed surfaces has a first
- 2 portion in a first plane and a second portion in a second plane, wherein the first plane forms an
- 3 angle of from about 91 degrees to about 180 with the second plane.

- 1 12. (Original) The radiator element of Claim 1 wherein the balanced symmetrical feed further
- 2 comprises:
 - 3 a cavity having a plurality of sidewall surfaces and a top surface disposed adjacent the
 - 4 pair of radio frequency feed lines; and

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5 a pair of transmission feed lines, each disposed adjacent to an opposing corresponding
6 sidewall surface of said cavity and having a first feed end electromagnetically coupled to a
7 corresponding one of the pair of radio frequency feed lines.

1 13. (Original) The radiator element of Claim 12 wherein each of the pair of transmission feed
2 lines further comprise a second feed end; and
3 the radiator element further comprises a balun having a pair of outputs each coupled to a
4 corresponding one of the second feed ends of the pair of transmission feed lines.

1 14. (Original) The radiator element of Claim 13 further comprising a pair of amplifiers each
2 coupled between a corresponding balun output and second feed end of one of the pair of
3 transmission feed lines.

1 15. (Original) A wideband antenna comprising:
2 a cavity plate having a first surface and a second opposing surface;
3 a first plurality of fins disposed on the first surface of the cavity plate spaced apart from
4 one another forming a first plurality of tapered slots having a feed surface;
5 a second plurality of fins disposed on the first surface of the cavity plate spaced apart
6 from one another forming a second plurality of tapered slots, each substantially orthogonal to a
7 corresponding one of the first plurality of tapered slots and having a feed surface; and
8 a plurality of balanced symmetrical feed circuits disposed on the first surface, each
9 having a pair of radio frequency (RF) feed lines electromagnetically coupled to corresponding
10 ones of the feed surfaces.

1 16. (Original) The wideband antenna of Claim 15 wherein the cavity plate further comprises a
2 plurality of apertures; and
3 wherein each of the plurality of balanced symmetrical feed circuits is disposed in a
4 corresponding one of the plurality of apertures.

1 17. (Original) The wideband antenna of Claim 17 further comprising a connector plate disposed
2 adjacent the second surface of the cavity plate and having a plurality of connections;

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3 and wherein each of the plurality of balanced symmetrical feed circuits has a plurality of
4 feed connections each coupled to a corresponding one of the plurality of connector plate
5 connections.

1 18. (Original) The antenna of Claim 15 wherein each of the fins has a height of less than about
2 approximately $0.25\lambda_L$, where λ_L refers to the wavelength of the low end of a range of operating
3 wavelengths.

1 19. (Original) The antenna of Claim 15 wherein each of the plurality of balanced symmetrical
2 feed circuits is a raised feed circuit having a shape which conforms to the feed surfaces of a
3 corresponding one of the plurality of fins.

1 20. (Original) The antenna of Claim 15 further comprising a plurality of baluns each coupled to
2 a corresponding RF feed line.

1 21. (Original) The antenna of Claim 20 further comprising a plurality of RF connectors each
2 coupled to a corresponding one of the plurality of baluns.

1 22. (Original) A method for converting the propagation mode of a waveform from a TEM mode
2 to a Floquet mode in a notched radiator element, the method comprising:
3 providing a pair of elements;
4 providing a balanced symmetrical feed circuit having a pair of radio frequency feed lines;
5 coupling the pair of radio frequency feed lines to the elements;
6 feeding the elements with a differential RF signal coupled to each of the pair of radio
7 frequency feed lines.

1 23. (Original) The method of Claim 22 wherein each of the pair of elements comprises a pair of
2 substrates each having a transition section and a feed surface and wherein the transition sections
3 form a tapered notch.

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- 1 24. (Original) The method of Claim 23 wherein each of the substrates has a height of less than
- 2 approximately $0.25\lambda_1$, where λ_1 corresponds to the wavelength of the low end of a range of
- 3 operating wavelengths.

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